

XXXIV. INDIAN PSYLLIDAE.

By D. L. CRAWFORD, *Stanford University, California.*

(Plates xxxiii—xxxv).

The following paper presents the descriptions of several new genera and species of *Psyllidae*, a family of Homoptera near to the *Aphididae*, which were sent to me for determination by the Indian Museum in Calcutta and the Museum of the Agricultural Research Institute in Pusa, Bengal. For the sake of convenience the two collections are treated separately, since only a few of the species are found in both. Several species of Indian *Psyllidae* have been described by Dr. Kieffer and Mr. Buckton, and at a later date the writer hopes to publish a key to all the Indian genera and species so far described. The types of new species from the Indian Museum are deposited in that place; the other types, however, are retained in the author's collection.

The illustrations, designed to show the most important characters, are drawn more or less to scale. Especially is this true of the figures of the forewings, in order to show the relative sizes of the insects; *Trioza gigantea*, *Kuwayama hirsuta* and *Phacopteron lentiginosum* are enlarged to only one-half the relative size of the others.

I.—COLLECTION OF THE INDIAN MUSEUM.

Genus *Phacopteron*, Buckton.

Insect large, robust; thorax strongly arched; head small, more or less retracted, narrower than thorax, with facial cones rather short, divergent, separate at base, subacute; eyes large, hemispherical; antennae slender. Prothorax long, almost vertical; propleurites at least moderately large, suture between them and pronotum not distinct; mesopleurum large; legs long; femora large; hind coxae very large, elongate, contiguous along inner margin, with spur short. Forewings large, more or less hyaline, somewhat rhomboidal in outline; radius and fourth furcal connected by a short cross-vein making a third marginal cell. Usually gall-making.

Type of genus: Phacopteron lentiginosum (Buckt.).

This genus is unmistakably related closely to *Pachypsylla* in nearly all its characters except the venation, in which it is similar to *Ceriacremum*. Because of this similarity it has hitherto been grouped with the latter genus, but this relation is only in the wing venation, whereas all the rest of the anatomical characters, even the shape of the wing, point to its affinity with *Pachypsylla*. By some unaccountable error Enderlein, in his paper on the *Psyllidae*

of Kilimandjaro, separated this genus from Kieffer's *Phacosema* by the absence of the cubital petiole. Buckton's original description and accompanying figure clearly show that this is not true. As a matter of fact, these two species, *Phacopteron lentiginosum*, Buckt., and *Phacosema gallicolla*, Kieffer, are undoubtedly not only congeneric but also very closely related specifically. Until I have further evidence, however, than Kieffer's description, I will not merge the two genera.

***Phacopteron lentiginosum*, Buckt.**

(Pl. xxxiii, figs. A, B, F; Pl. xxxv, fig. A.)

Length of body 4·7 mm.; length of forewing 4·5 mm.; greatest width of wing 2 mm.; width of vertex between eyes ·45 mm.; with eyes ·9 mm. General colour brown, most of surface blotched with lighter brown, especially on vertex, pronotum and abdomen; venter lighter brown; legs concolorous; antennae brown, with tips of segments and entire terminal segment black; forewings maculated apically dark brown to black; veins spotted closely with black. Body very large, robust, sparsely and briefly pubescent.

Head small, retracted under pronotum, with eyes much narrower than thorax, about as broad as prothorax; vertex transversely rather flat but rounded down forward; post-ocelli strongly elevated; facial cones short, widely separate at base, divergent, porrect, subacute at tip; pubescence short; labrum small; eyes large, hemispherical; ocelli large; anterior ocellus between and a little above facial cones; antennae slender, long, almost as long as head and thorax, tip slightly clavate.

Thorax very large, broad, strongly arched; pronotum long, almost overhanging vertex; propleurites moderately large, with suture between them and pronotum scarcely visible. Dorsulum ascending, long; mesopleurites very large, conspicuous; scutum long; legs long, large; all femora somewhat enlarged, stout, with tibial groove deep, conspicuous; tibiae armed; tarsi large; hind coxae very large, elongate, with coxal spur small, blunt. Forewings large, hyaline, maculate, somewhat rhomboidal in shape, a little more than twice as long as broad, broadest just beyond first marginal cell; cubital petiole more than half as long as discoidal subcosta; radius straight, not parallel to margin, connected with arch of fourth furcal by short cross-vein, thence flexed sharply toward margin, terminating slightly before apex of wing; first marginal cell small, furcals subequal; second marginal cell quadrangular, broadest at margin; third marginal cell includes apex of wing.

Abdomen large, robust. *Male*—Genital segment rounded; claspers rather short, roundly acute at tip, curved forward; anal valve large, broadest near base. *Female*—Genital segment relatively small, acute at apex; dorsal and ventral plates subequal in length.

Redescribed from one male and three females from Dehra Dun, base of West Himalayas, and from Poona, W. India, on *Garuga pinnata*. These specimens are paratypes of the specimens used by Mr. Buckton in his original description. This species produces galls on *Garuga pinnata*, Roxb.

Apsylla, gen. nov.

Body robust; thorax broad, strongly arched, shagreened; head small, short, more or less retracted; vertex rounded forward, shagreened; facial cones entirely wanting; eyes moderately large, hemispherical; anterior ocellus in front, or inferior; antennae ten-segmented, short, thick, with two very long setae at tip. Pronotum almost, or quite, vertical; pro-epimeron short; propisternum longer. Legs short, all similar and of equal size and length, apparently not saltatory; hind coxae unusually small, not larger than mesocoxae and very similar in shape, with coxal spurs lateral, small and almost obsolete. Wings hyaline, both pairs more nearly similar than usual; forewings weakly veined, especially on margin apically.

Type of genus: Apsylla cistellata (Buckt.).

This genus is very distinct from all others in several respects. The principal difference lies in the metacoxae and antennae. It is possible that *Pauropsylla udei*, Rubsaamen, a species which I have not seen, is related to this species.

Apsylla cistellata (Buckt.).

(Pl. xxxiii, figs. C, D, E, K; Pl. xxxv, fig. B.)

Length of body 3.1 mm.; length of forewing 3.4 mm.; greatest width 1.4 mm.; width of vertex between eyes .5 mm.; with eyes .78 mm. General colour black, male sometimes brown; antennae lighter; wings whitish-hyaline. Body short, relatively robust, surface shagreened.

Head small, short, deflexed, with eyes much narrower than thorax; vertex transversely rather flat, rounded down strongly forward, with post-ocellar area strongly elevated. Eyes large; anterior ocellus in front, barely visible from above; antennae, with terminal setae, about as long as width of head with eyes, basal segments scarcely thicker than succeeding, decreasing in length to tip; terminal setae about as long as four distal segments, black; labrum small.

Thorax strongly arched, broad; pronotum somewhat overhanging vertex, long; propleurites indistinct; mesopleurum large; femora all short, not enlarged; meso- and metacoxae similar in shape and size, metacoxal spur small, lateral; hind tibiae unarmed. Forewings hyaline, transparent, weakly veined, a little more than two and a half times as long as broad, broadest across first marginal cell; marginal veins very weak apically; first furcal very short,

almost obsolete; second arched; second marginal cell triangular, larger; radial cell short; cubital petiole almost twice as long as discoidal subcosta; clavus long, large. Hind wings veined less distinctly than forewings but very similarly, except radial cell wanting.

Abdomen short, thick. *Male*—Claspers curved forward, subacute, moderately long; anal valve erect, large, with short rounded lobe projecting caudad, truncate above, with anal opening distinct. *Female*—Genital segment short, large and subglobose at base, produced into two short, needle-like processes with a bivalve ovipositor between, exerted.

Redescribed from two pairs ("type material") from Dehra Dun, West Himalayas, and seven males and nine females from Bettiah, Champaran, Bengal, from galls on mango shoots; one male from Dehra Dun in mango gall. Buckton described this species as a *Psylla*, but, of course, it is widely different from the members of that genus.

Eurhinocola, gen. nov.

Body robust; head broad, more or less recessive over pronotum and pleurites, closely adpressed to prothorax; vertex somewhat roundly emarginate over base of antennae; facial cones short, truncate, transversely rectangular or nearly so, almost contiguous on inner margin, not continuing in plane of vertex as in *Euphyllura*, but distinctly separated therefrom; anterior ocellus on front margin of vertex; eyes small; antennae short. Thorax broad; propleurites more or less concealed by eyes; legs short. Wings more or less coriaceous, not hyaline, slightly rhomboidal in outline or elongate-ovate; venation somewhat similar to *Euphyllura*.

Type of genus: Eurhinocola gravelyi, Crawford.

This genus is closely related to *Euphyllura*, differing markedly in the cephalic characters chiefly. Many of the species heretofore included in the genus *Rhinocola* will fall into this genus, since *Rhinocola* must be removed to the subfamily Liviinae. *Rhinocola aceris*, L., the type of that genus, is closely related to *Livia* in the fundamental characters and, therefore, can not include most of the species heretofore placed therein. This matter is treated more in detail in another paper on Psyllidae which is at present in manuscript form.

Eurhinocola gravelyi, n. sp.

(Pl. xxxiii, figs. G. H.; Pl. xxxiv, fig. E; Pl. xxxv, fig. I.)

Length of body 1.5 mm.; length of forewing 1.4 mm.; greatest width .65 mm.; width of vertex between eyes .30 mm.; with eyes .46 mm. General colour brown to black, with abdomen and legs apically light brown to dirty white; wings yellow. Body very small, robust; surface shagreened.

Head almost as broad as thorax, closely adpressed to prothorax, scarcely deflexed; vertex a little broader than long, rather plane, with a shallow fovea discally on each side of median line, almost straight behind, anterior margin roundly emarginate above antennae; facial cones short, broad, transversely rectangular, somewhat deflexed from plane of vertex and distinctly separated therefrom by a deep suture (not as in *Euphyllura*), scarcely pubescent; anterior ocellus visible from above; eyes small, white, slightly recessive over pronotum; labrum visible from front. Antennae short, not longer than width of head, rather thick.

Thorax broad, robust, short; prothorax moderately long, rather flat transversely, concealed somewhat laterally by recessive eyes; propleurites mostly concealed by eyes; coxae small; legs short, relatively stout. Wings small, somewhat coriaceous and wrinkled, not transparent, a little more than twice as long as broad, very slightly rhomboidal in outline; first marginal cell elongate; cubital petiole twice as long as discoidal subcosta; pterostigmal vein almost obsolete. Hind wings smaller, hyaline.

Male—Abdomen constricted at base of genitalia; latter large; anal valve large, bilobed; claspers large, acute at tip, simple. *Female*—Genital segment as long as rest of abdomen, deflexed, acuminate; ventral valve shorter than dorsal, more acute.

Described from a considerable number of specimens of both sexes collected by F. H. Gravely from the "jungle between foot of Dawna Hills and Burmo-Siamese Frontier." I take pleasure in naming this species after the collector.

Type No. 3618/19.

***Euphalerus vittatus*, n. sp.**

(Pl. xxxiii, figs. I, J, L, M; Pl. xxxv, fig. C.)

Length of body 2.2 mm.; length of forewing 2.2 mm.; greatest width .9 mm.; width of vertex between eyes .39 mm.; with eyes .63 mm.; length from crown to tip of cones .41 mm. General colour whitish and dark brown or black; dorsum and vertex whitish; a dark brown vitta extending from each eye over upper portion of pleurum and thence along upper half, or slightly less, of forewing to apex of latter; lower portion of pleura whitish; venter brown; abdomen more or less variegated. Body of medium size, not robust.

Head with eyes not as broad as thorax, quite long, descending; vertex broader than long, conspicuously vermiculous-punctate, flat, with a fovea on each side of median line posteriorly; anterior margin marked by an impressed line between vertex and facial cones; latter large, broad, rounded at tip, contiguous, about two-thirds as long as vertex, emarginate laterad in front of antennae, with short stiff white pubescence. Eyes large, hemispherical; ocelli large. Antennae slender, about as long as head to metanotum, whitish with segments black apically and two terminal

segments black; insertion large, between vertex and facial cones. Labrum narrowly visible from side.

Thorax slightly arched; pronotum vermiculous-punctate, rather long, sides parallel; propleurites narrow, typical for genus; coxa large. Dorsulum ascending, finely punctate, about as long as scutum. Forewings rather thick, not coriaceous, whitish except on black or brown vitta, about two and one-third times as long as broad, broadest across first marginal cell, very slightly rhomboidal in shape; first marginal cell large, long, larger than second; first cubital short; radius quite long; discoidal subcosta shorter than cubital petiole; pterostigma prominent; veins spotted with black.

Male—Genital segment small, rounded; anal valve simple, rather long, sides parallel; claspers short, small, with stiff spiny pubescence, acute at tip; penis long, slender, clavate at tip. *Female*—Genital segment short, small; dorsal plate slightly longer than ventral, both very acute.

Described from seven males and seven females from Calcutta, on *Cassia ? fistula* (N. Annandale). This is somewhat similar to an American species, *E. vermiculosus*, Crawford. (MS.).

Type No. 9738/18.

Euphalerus citri (Kuwayama).

(Pl. xxxiii, figs. N, O, P; Pl. xxxv, fig. D.)

Length of body 2.4 mm.; length of forewing 2.4 mm.; greatest width 1.0 mm.; width of vertex between eyes .35 mm.; with eyes .55 mm.; length of vertex to tip of cones .32 mm. General colour brown, vertex slightly lighter; antennae black at tip; eyes darker, with black stripe from eye to tip of cone on side; forewings with a spotted macula of brown on the upper margin from a little below tip of clavus to tip of radius, and another on lower margin not quite merged into first; maculae not continuous but composed of smaller scattered spots.

Head narrower than thorax, descending; vertex flat, very finely pubescent, finely punctate, broader than long, with a fovea on each side in rear centre; anterior margin almost straight; facial cones broad at base, in same plane with vertex, convergent toward and rounded at apex, almost contiguous, finely pubescent. Antennal bases scarcely visible, as in other species; antennae short, not longer than head and pronotum combined, slender. Eyes large.

Thorax very finely pubescent; pronotum rather long, sides parallel; pleurites typical for genus. Forewings subhyaline, rather thickened as in other species, maculate, attenuate at base, broadest subapically, rounded at apex, about two and a third times as long as broad; first cubital long; second marginal cell larger than first; radius long; pterostigma very narrow, quite long.

Male—Genital segment rather conspicuous; anal valve elongate-pyriform or flask-shaped, attenuate above; claspers long,

slender, subacute at tip, simple. *Female*—Genital segment short, small, acute at tip; dorsal plate very slightly longer than ventral.

Described from one female from Adra, Manbhum District (J.T. Jenkins), November 12th, 1909. Seventeen specimens, both sexes, of this species were collected by Mr. Geo. Compere on citrus trees in the Philippine Islands. He states that he found the same insect in India on citrus trees in considerable numbers. The description of the male is based on these specimens.

Diceraopsylla, gen. nov.

Body robust; thorax strongly arched; body surface conspicuously shagreened; head with eyes not as broad as thorax; vertex more or less plane, concave transversely, slightly cleft in front; facial cones entirely wanting, with two rounded ridges on face extending from antennal bases to labrum; eyes not large; antennae slender, at least moderately long. Pronotum ascending; proepisternum large, protruding above, hindmost tergite of metanotum (post-scutellum) bifid; appearing as two blunt horns extending back; legs normal; wings membranous, hyaline, rounded at apex, with a pterostigma.

Type of genus: Diceraopsylla brunettii, Crawf.

This genus is somewhat similar to *Heteropsylla*, Crawf. (MS.) in the absence of facial cones, but differs not only from this but from all other genera in the bifid post-scutellum, for which the genus is named.

Diceraopsylla brunettii, n. sp.

(Pl. xxxiii, figs. Q, R, U; Pl. xxxv, fig. G.)

Length of body 2.5 mm.; length of forewing 3.8 mm.; greatest width 1.7 mm.; width of vertex between eyes .35 mm.; with eyes .68 mm. General colour black; face, legs, tip of abdomen brown; antennae brown, with segment tips and terminal segment black; wings somewhat maculate. Body rather small, very robust, surface conspicuously shagreened, including antennae and femora.

Head small, short, with eyes distinctly narrower than thorax; vertex with post-ocellar regions and ocular margins elevated, with a small fovea on each side of median line posteriorly; front margin rounded down, with anterior ocellus in front visible from above, somewhat cleft in front, as in *Rhinoopsylla*. Antennae ten-segmented, slender, longer than head and thorax; I moderately large; III longest; IX and X short, thickened; labrum small.

Pronotum ascending, arched; episternum large, prominent; epimeron small, mostly concealed; dorsulum large; scutum long; post-scutellar processes fully as long as thick, rounded at tip. Legs normal; hind tibiae unarmed. Forewings rather large, with a macula over first furcal and several small black spots on the veins especially at the furcations, broadly rounded at the apex, about two and a half times as long as broad; first marginal cell usually

large; second marginal cell smaller than first; radius short, terminating far from apex of wing; pterostigma short, broad; cubital petiole almost as long as discoidal subcosta. Hind wings hyaline, scarcely veined.

Male—Abdomen slender; genital segment relatively large; scarcely rounded; claspers slender, arched, quite acute at tips; anal valve slender, rather long.

Described from two males from Darjeeling, East Himalayas, altitude 7000 ft. (E. Brunetti), May 29th, 1910.

Type No. 9733/18.

Psylla simlae, n. sp.

(Pl. xxxiii, figs. S, T; Pl. xxxv, fig. S.)

Length of body 2 mm.; length of forewing 2·5 mm.; greatest width 1 mm.; width of vertex between eyes ·41 mm.; with eyes ·67 mm. General colour brown, head, legs and antennae lighter brown. Body small.

Head rather large, with eyes about as broad as thorax, deflexed; vertex descending, almost flat, with a small fovea on each side of median line, lobes rather triangular in shape; facial cones large, almost as long as vertex, slightly declinate from plane of vertex, separated therefrom by a deeply impressed line, divergent, subacute at apex, briefly pubescent. Antennae slender, about as long as head and thorax, black at tip. Eyes recessive toward thorax.

Thorax somewhat arched; notum finely shagreened, except pronotum; latter rather short; propleurites long; epimeron small. Legs normal; hind tibiae with small spur at base. Forewings hyaline, a little more than twice as long as broad, with a black spot at tip of clavus; marginal cells subequal; radius long; pterostigma long, rather broad; cubital petiole about half as long as discoidal subcosta.

Female—Genital segment moderately short, plates subequal, rather acute.

Described from one female from Simla, West Himalayas, altitude 7000 ft. (N. Annandale).

Type No. 9701/18.

Rhinopsylla stylata, n. sp.

(Pl. xxxiii, fig. W; Pl. xxxiv, fig. F; Pl. xxxv, fig. H.)

Length of body 2·5 mm.; length of forewing 3 mm.; greatest width 1·2 mm.; width of vertex between eyes ·34 mm.; with eyes ·56 mm. General colour deep black; body moderately large, surface conspicuously reticulated or shagreened.

Head a little narrower than thorax, slightly deflexed; vertex excavated in centre between median line and elevated post-ocellar area, deeply emarginate on front margin, with anterior ocellus at

apex of emargination and visible from above; facial cones wanting, slightly swollen at base of antennae; labrum visible from front. Antennae slender, about three times as long as width of head; I and II large; III long, yellowish. Eyes large; rostrum long.

Prothorax moderately long; pleurites large, prominent; dorsulum deeply reticulated; hind coxae very large, with long spur; hind tibiae with small tooth at base. Wings hyaline, a little more than twice as long as broad, rather rounded at apex; marginal cells subequal; fourth furcal at apex of wing.

Female—Abdomen broad, suddenly narrowed before genital segment; latter slender, rather long, acuminate, valves subequal in length, acute at tip.

Described from one female from valley of River Sutlej, below Simla (W. Himalayas), May, 1910 (N. Annandale).

Type No. 9708/18.

Kuwayama hirsuta, n. sp.

(Pl. xxxiii, figs. V, Y; Pl. xxxv, fig. I.)

Length of body 2·7 mm.; length of forewing 5·6 mm.; greatest width 2·2 mm.; width of vertex between eyes ·52 mm.; with eyes ·96 mm. General colour light brown, with brown markings on dorsulum; venter of abdomen lighter; antennal segments black at tips. Body large, long, entire surface covered with long, light brownish pubescence.

Head large, with eyes about as broad as thorax, not deflexed; vertex sulcately impressed on each side of median line, each lobe rounded forward in front, post-ocellar areas elevated strongly; facial cones wanting, with a slight rounded swelling at base of antennae; anterior ocellus in front; eyes large, very prominent. Antennae slender, almost as long as entire body, not pubescent. Labrum small.

Thorax long, rather narrow, scarcely arched; pronotum moderately long, narrow transversely; propleurites large; episternum prominently bulging outward above. Dorsulum long, not arched; legs long; femora stout, with tibial groove long; hind coxae very large; hind tibiae with large spur at base. Forewings large, hyaline, transparent, acutely angled at apex, about two and a half times as long as broad, broadest across middle, with a brown spot near tip of clavus; first marginal cell unusually large, about three times as large as second; first cubital very short; fourth furcal terminating at tip of wing; radius short.

Male—Abdomen short, thick; genital segment short, somewhat retracted; claspers slender, arched, toothed at apex, anal valve broad at base, slender at tip.

Described from one male from Igatpuri, Western Ghats, Bombay Presidency, November 20th, 1909.

Type No. 9730/18.

Until further material is available, at least, this species is included in the genus *Kuwayama* which was erected for a Mexican

species and one from Southern California. In the tribe Triozini to which this belongs, the hind tibial spur in this species is rather remarkable.

Trioza gigantea, n. sp.

(Pl. xxxiii, figs. X, Z; Pl. xxxv, fig. J.)

Length of body 4 mm.; length of forewing 6.6 mm.; greatest width 2.6 mm.; width of vertex between eyes .53 mm.; with eyes .93 mm. General colour black on dorsum, light brown on venter; vertex, eyes and antennae black; facial cones brown; pronotum brown; dorsulum shining black; metanotum dark brown; fore tibiae dark brown. Body surface covered sparsely with long brown pubescence, which is not very prominent; body very large.

Head broad, about as broad as thorax, much broader than prothorax and dorsulum which appear somewhat as a neck; vertex roundly concave between eyes, descending, smooth, glossy; facial cones long, almost as long as vertex, vertical, divergent, acute at apex, pubescent. Eyes large, prominent; anterior ocellus in front; antennae very long, as long as body, moderately thick, densely hirsute, all segments long, except I, II and X.

Thorax arched; pronotum short, depressed below head and dorsulum; propleurites large; dorsulum strongly arched, narrow, overhanging pronotum. Legs long; femora rather thick; hind coxae very large; hind tibiae without tooth at base. Forewings large, hyaline, transparent, narrowly rounded at apex, two and a half times as long as broad; first marginal cell more than twice as large as second; first cubital shorter than first furcal; radius long, parallel with costa; veins setose, conspicuously so on basal portion of wing. Hind wings long, slender, hyaline.

Female—Abdomen long, large; genital segment short, subacute at tip; dorsal plate blunt at tip.

Described from one female from Darjeeling, East Himalayas, altitude 7000 ft. (E. Brunetti), May 26th, 1910.

Type No. 9734/18.

This is somewhat related to Kuwayama's *Stenopsylla nigricornis*, and probably does not belong in the genus *Trioza*. Until further evidence, however, is available, it will be included in the large genus.

Trioza hyalina, n. sp.

(Pl. xxxiv, figs. A, B; Pl. xxxv, fig. K.)

Length of body 1.9 mm.; length of forewing 2.9 mm.; greatest width 1.2 mm.; width of vertex between eyes .33 mm.; with eyes .47 mm. General colour lemon yellow, dorsulum brown cephalad, antennae black at tip, eyes black. Body small.

Head narrower than thorax, small, deflexed; vertex impressed discally, bulging on each side of median line in front; facial cones almost as long as vertex, subvertical, divergent, acute at tip,

pubescent. Antennae about three times the width of head, slender. Eyes prominent; anterior ocellus slightly visible from above.

Thorax not broad; pronotum short, depressed below dorsulum; latter long, narrow. Wings proportionately rather large, hyaline, about two and a third times as long as broad, radial margin arched, rather rounded at apex; radius flexed; fourth furcal terminating at apex of wing.

Male—Genital segment rather large, anal valve long, sides concave cephalad, subparallel, truncate at tip; claspers long, stout at base, acute at tip. *Female*—Genital segment about half as long as rest of abdomen; dorsal valve slightly longer than ventral, both acute.

Described from three males and two females from Simla, West Himalayas, 7000 ft. (N. Annandale).

Type No. 9707/18.

***Trioza analis*, n. sp.**

(Pl. xxxiv, figs. C, D; Pl. xxxv, fig. L.)

Length of body 2·4 mm.; length of forewing 3·4 mm.; greatest width 1·3 mm.; width of vertex between eyes 30 mm.; with eyes 57 mm. General colour black, with vertex, part of pronotum, abdomen ventrad, legs, basal half of antennae reddish brown.

Head not as broad as thorax, somewhat deflexed; vertex with a deep sulcus down median line and one on each side extending obliquely toward front margin of eye, pubescent; facial cones almost as long as vertex, slightly divergent, deflexed from plane of vertex, subacute at tip, pubescent. Antennae slender, about twice as long as width of head; eyes large.

Prothorax moderately long; propleurites large, prominent; dorsulum long. Legs rather short and stout. Wings hyaline, about two and a half times as long as broad, roundly acute at tip; first marginal cell smaller than second; radius rather short; clavus black at tip.

Female—Abdomen long, convergent to tip; genital segment very short, slightly longer than preceding segment; ventral valve very small, triangular in profile.

Described from two females from Simla, West Himalayas, 7000 ft. (N. Annandale).

Type No. 9702/18.

II.—PUSA COLLECTION.

***Apsylla cistellata* (Buckton).**

Six specimens, both sexes, from Pusa, Bengal, on mango trees.

***Pauropsylla depressa*, n. sp.**

(Pl. xxxiv, figs. G, H; Pl. xxxv, fig. N.)

Length of body 2·3 mm.; length of forewing 3·3 mm.; greatest width 1·7 mm.; width of vertex between eyes 43 mm.; with eyes

·76 mm. General colour orange red ; legs and antennae lighter to yellowish, latter black at tip ; tarsi often more or less black. Body robust, moderately large.

Head short, deflexed, with eyes narrower than thorax ; vertex somewhat pubescent, rather broad, posterior margin arcuate downward between eyes, median line not visible ; anteriorly roundly bulging, surface smooth, with anterior ocellus in front visible from above ; antennal insertions beneath and slightly swollen ; facial cones entirely wanting. Eyes rather small ; post-ocelli elevated. Labrum large, globose, visible from front. Antennae about one and a third times as long as width of head, slightly compressed at tip, terminal setae moderately long.

Thorax strongly arched, broad, glabrous ; pronotum short, scarcely visible from above between head and dorsulum ; latter rather large, ascending ; mesopleurae very large and prominent. Legs long, slender, typical. Forewings large, hyaline, transparent, broadest subapically, rather square at apex, slightly more than twice as long as broad ; marginal cells small, subequal ; radial cell broad at base ; cubital petiole very short.

Abdomen in both sexes usually broad and depressed, subcircular in outline from above. *Male*—Genital segment rather small ; anal valve broadest at base ; claspers as long as anal valve, truncate at tip. *Female*—Genital segment about half as long as rest of abdomen, acute at tip ; usually bent down, and often (in dried specimens at least) lying along ventral surface of abdomen.

Described from one male and five females from Pusa, Bengal, in galls on leaves of *Ficus glomerata* ("gular").

Pauropsylla tuberculata, n. sp.

(Pl. xxxiv, figs. I, J, L ; Pl. xxxv, fig. E.)

Length of body 1·8 mm. ; length of forewing 2·1 mm. ; greatest width 1·0 mm. ; width of vertex between eyes ·38 mm. ; with eyes ·68 mm. General colour red to dark reddish brown ; dark form :—dorsulum posteriorly orange yellow, vertex above and between ocelli orange, remainder dark reddish brown, except connexivum of abdomen white ; light form :—same as above but shades lighter ; antennae black at tip. Body robust, rather small.

Head short, deflexed, with eyes fully as broad as thorax ; vertex angularly emarginate behind, rounded down and forward, surface rather plane ; anterior ocellus visible from above, near to labrum ; post ocelli rather remote from eyes, not prominently elevated ; labrum large, almost visible from above, easily from front ; facial cones entirely wanting ; antennae attached a little above anterior ocellus, a little longer than width of head ; terminal setae half as long as antennae.

Thorax strongly arched, robust ; pronotum short, ascending ; pleurites mostly concealed by recessive eyes and occiput ; dorsulum arched ; mesopleurae large, anterior ; post-scutellum pentangular.

Legs typical; hind coxae thick, long; hind femora constricted midway. Forewings relatively rather small, broadest and rather square at apex, attenuate at base, hyaline and transparent, a little less than twice as long as broad, basal margin black; first marginal cell very small, triangular; second large, rectangular; radius angulate midway and touching arch of fourth furcal; cubital petiole shorter than discoidal subcosta.

Abdomen robust, third and fourth tergites produced upward into two prominent humps. *Female*—Genital segment short, stout, acute at tip; dorsal valve a little longer than ventral.

Described from six females from Pusa, Bengal; two (darker forms) on "pumpkin," and four (lighter and slightly smaller forms) on *Alstonia scholaris*. While this is somewhat atypical of the genus, yet it seems to be closely allied thereto.

Euphalerus vittatus, Crawford.

Six specimens from Narainganj, Eastern Bengal and Assam, "on a bush."

Euphalerus citri (Kuwayama).

Seven specimens from Pusa, Bengal, on orange (*Citrus aurantium*), and on Lucerne.

Psyllopa punctipennis, n. sp.

(Pl. xxxiv, figs. K, O; Pl. xxxv, fig. U.)

Length of body 1.7 mm.; length of forewing 2.3 mm.; greatest width 1.0 mm.; width of vertex between eyes .33 mm.; with eyes .53 mm. General colour light brown; dorsulum and scutum with several dark brown longitudinal stripes; antennae black at tips of segments III to X; forewings with numerous brown or black dots and spots both on veins and membrane.

Head a little narrower than thorax, not much deflexed; vertex longer than half its width, with a slight foveal impression discally; facial cones about two-thirds as long as vertex, rather strongly divergent, narrowly rounded at tip; eyes large; antennae less than twice as long as width of head, slender.

Thorax not strongly arched; pronotum rather long; pleurites broad. Legs typical. Forewings hyaline, rounded at apex, relatively rather small, about two and a third times as long as broad; cubital petiole a little shorter than discoidal subcosta.

Male—Genital segment rather large; anal valve broad at base, truncate at apex; claspers rather blunt at tip. *Female*—Genital segment thick, about half as long as rest of abdomen, valves subequal, rather thickly pubescent.

Described from four males and four females from Pusa, Bengal, on indigo. This is probably the adult of Buckton's *Psylla isitii*, which he described from the nymph only. In order to avoid con-

fusion, however, in case they should not be identical, I have given it another name. The forewing of this species bears a close resemblance to *Aphalara multipunctata*, Kuwayama (Japanese).

***Psyilopa obscura*, n. sp.**

(Pl. xxxiv, fig. S; Pl. xxxv, fig. M.)

Length of body 2.1 mm.; length of forewing 3.6 mm.; greatest width 1.5 mm.; width of vertex between eyes .44 mm.; with eyes .68 mm. General color orange yellow throughout; antennae black on apical half. Body rather large, robust.

Head about as broad as thorax, deflexed; vertex moderately large, typical; facial cones a little more than half as long as vertex, thick at base, roundly acute at apex, much deflexed from plane of vertex; eyes large; antennae fully twice as long as width of head, slender.

Thorax broad, arched; pronotum rather long; legs moderately long. Forewings hyaline, two and a third times as long as broad, rounded at apex; pterostigma moderately large; cubital petiole shorter than discoidal subcosta.

Female—Genital segment thick at base, as long as abdomen, subacute at apex; dorsal valve a little longer than ventral.

Described from one female from Pusa, Bengal, taken on mango leaves.

***Tenaphalara elongata*, n. sp.**

(Pl. xxxiv, figs. M, N, P, Q; Pl. xxxv, fig. O.)

Length of body 3.1 mm.; length of forewing 3.4 mm.; greatest width 1.0 mm.; width of vertex between eyes .28 mm.; with eyes .56 mm. General colour greenish yellow throughout; antennal joints V to X black at tip. Body slender, very long.

Head moderately long, not deflexed, as wide as thorax; vertex rather broad, rounded down and forward uniformly, rather plane, long behind eyes; facial cones entirely wanting; eyes small; post-ocelli not elevated; anterior ocellus visible from above; antennae half as long as body, slender, terminal setae short; labrum small, subacute apically.

Thorax long, slender, cylindrical, not arched; pronotum rather long; pleurites large, sutures often indistinct; dorsulum small. Legs rather short; hind tibiae short, not longer than femora, with a small tooth at base. Forewings long, slender, hyaline, transparent, acute at tip, three and a half times as long as broad; venation suggests *Carsidara*; second marginal cell larger than first; fourth furcal near apex of wing; pterostigma open; with a callus (appears as a pseudo-vein) extending from tip of pterostigma to radius and from radius to base of second marginal cell; cubital petiole longer than discoidal subcosta; veins and apical portion of membrane yellowish.

Abdomen elongate, slender. *Male*—Anal valve long, constricted at base, sides subparallel; claspers long, slender, subacute at tip, not toothed. *Female*—Dorsal genital valve irregular in outline, constricted near tip, acute; ventral valve usually as long as dorsal, broad basally (viewed from beneath), divided and very acute at tip.

Described from seventeen males and females from Pusa, Bengal, on "Silk Cotton." This is very similar to the Japanese species *Tenaphalara acutipennis*, Kuwayama, differing only in a few minor characters.

***Homotoma distincta*, n. sp.**

(Pl. xxxiv, figs. T, U; Pl. xxxv, fig. P.)

Length of body 1.7 mm.; length of forewing 2.8 mm.; greatest width 1.1 mm.; width of vertex between eyes .37 mm.; with eyes .59 mm. General colour light yellow, glossy; antennae brown to black. Body rather small.

Head short, somewhat deflexed, with eyes not quite as broad as thorax, deeply cleft in front between antennae; vertex glossy, sparsely pubescent, descending from each side to median line; anterior ocellus not visible from above; facial cones inferior, not visible from above, short, widely divergent, slightly pubescent. Antennae thick, more than twice as long as width of head, thickly pubescent; I stout, III as long as IV—VI; terminal setae short. Eyes large; labrum small.

Thorax somewhat arched; pronotum short, depressed below dorsulum. Legs rather stout, short; hind tibiae without tooth at base. Forewings hyaline, transparent, acute at apex, about two and a half times as long as broad; first marginal cell wanting; second very large, including apex of wing; cubital petiole and base of second cubital very close to discoidal subcosta and base of radius but not joined thereto; radius short, black.

Female—Genital segment about as long as rest of abdomen, stout; dorsal valve a little longer than ventral, both rather acute.

Described from one female from Pusa, Bengal, taken "on the wing." This is very close to *Homotoma radiatum*, Kuwayama (Japan), but seems to be quite distinct in several respects.

***Allotrioza minuta*, n. sp.**

(Pl. xxxiv, fig. R; Pl. xxxv, fig. F.)

Length of body 1.2 mm.; length of forewing 1.8 mm.; greatest width .75 mm.; width of vertex between eyes .20 mm.; with eyes .34 mm. General colour of male brown to dark brown, legs, facial cones and antennae light greenish yellow; female brown on vertex and dorsum of thorax and abdomen; ventral portion, legs, facial cones and antennae light greenish yellow; antennae black at tip in both sexes.

Head scarcely or only slightly deflexed, relatively rather large; vertex with a foveal impression on each side of median line somewhat posteriorly, emarginate on anterior margin over front ocellus and full on each side of emargination; facial cones very small, whitish, acute at tip, not strongly divergent, subhorizontal, scarcely pubescent. Antennae short, only a little longer than width of head.

Thorax scarcely arched, pronotum relatively rather long, on same level as vertex and dorsulum; latter moderately long; legs typical. Forewings small, hyaline, narrowly rounded at apex, about two and two-thirds times as long as broad; radius short.

Male—Genital segment rather large; anal valve moderately broad, truncate above, slightly constricted near apex; claspers stout, not toothed at tip. *Female*—Genital segment about half as long as abdomen, valves of equal length, pubescent near apex.

Described from three males and two females from Hazaribagh, Bengal, "on leaves."

***Trioza urticae*, Linn.**

Two females from Keonthal, Punjab, on nettle (*Urtica* sp.). This is quite typical of the European form of the same species.

***Trioza fletcheri*, n. sp.**

(Pl. xxxiv, fig. V; Pl. xxxv, fig. Q.)

Length of body 1·7 mm.; length of forewing 2·8 mm.; greatest width 1·2 mm.; width of vertex between eyes ·26 mm.; with eyes ·46 mm. General colour flavous yellow; antennae black at tip. Body rather small.

Head narrower than thorax, deflexed; vertex moderately long, with a prominent longitudinal sulcate impression on each side of median line; facial cones small, about half as long as vertex, only slightly divergent, subvertical, acute at tip. Antennae a little longer than width of head. Thorax somewhat arched, typical. Legs moderately long, slender. Forewings hyaline, more than two and a half times as long as broad, subacute at apex; radius short; marginal cells subequal.

Female—Genital segment about as long as abdomen, stout, valves subequal, rather acute.

Described from three females from Pusa, Bengal, on *Gmellina arborea*. This species is named for Mr. T. B. Fletcher, Imperial Entomologist in Pusa.

***Trioza fletcheri minor*, n. var.**

(Pl. xxxv, fig. R).

Similar to the species in most respects but uniformly smaller throughout; facial cones scarcely one-third as long as vertex and

less divergent. *Male*—Genital segment typical; anal valve sub-triangular in profile; claspers long, blunt and black at tip.

Described from two males and two females from Pusa, Bengal, on *Terminalia arjuna*.